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| EXAMINER | |
|---|---|
| SMITH, JOSHUA Y | |
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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

| Office Action Summary | Application No. | Applicant(s) | |
|---|---|---|---|
| | 10/508,750 | MOORE, ANDREW | |
| | Examiner | Art Unit | |
| | JOSHUA SMITH | 2619 | |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on *04 June 2008*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) *9-16* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *9-16* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

## DETAILED ACTION

The amendment filed 06/04/2008 has been entered.

- **Claims 9-16 are pending.**
- **Claims 1-8 are previously cancelled.**
- **Claims 9-16 stand rejected.**

### *Claim Rejections - 35 USC § 112*

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

**Claim 16** is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claim 16 states: "providing to each class the proportion of the network resource allocated to it, by providing the network resource ***with*** buffer depth in a communications network element" (emphasis added by examiner). This is indefinite since it is unclear whether "buffer depth" is being provided at the same time or along side "the network resource", or whether "the network resource" is being provided through a utilization of "buffer depth". Examiner will treat "providing the network resource with buffer depth" to indicate that "the network resource" is being provided through a utilization of "buffer depth".

***Claim Rejections - 35 USC § 103***

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

**Claims 9, 10, 14 and 16** are rejected under 35 U.S.C. 103(a) as being unpatentable over Giroux et al. (Patent No.: US 6,317,416 B1) in view of Donis et al. (Pub. No.: US 2002/0075882 A1), hereafter referred to as Giroux and Donis, respectively.

**In regards to Claim 9**, Giroux teaches in column 3, lines 12-13, a connection admission controller computes the minimum bandwidth required for each service class (providing a communications network resource to a plurality of classes of use of a network, a different level of service being associated with each class of use).

Giroux also teaches in column 2, lines 11-24, a fair queue servicing arrangement in a multi-service class packet switched network, comprising a weighted fair queuing controller, and buffer means for receiving incoming packets in queues, characterized in

that further comprises means for monitoring buffer usage for each queue, means for determining the bandwidth requirements of each class of service, and a service weights manager for dynamically modifying the weights of said weighted fair queuing controller means in response to said buffer usage and bandwidth requirements (a demand estimator for estimating a demand for each class, and a dynamic resource allocator for allocating to each class a proportion of a network resource, a proportion allocated being dependent on an estimated demand for each class, and an allocation optimizing use of an available network resource while ensuring a level of service of each class is observed).

Giroux also teaches in column 2, lines 49-52, a service weight manager that dynamically modifies weights to be used by a WFQ Scheduler (a communications network element for providing to each class a proportion of network resource allocated to it).

Giroux fails to clearly teach a network resource comprising buffer depth on a network element, a dynamic resource allocator being arranged to dynamically adjust respective buffer depth for a class for queuing data packets.

Donis teaches in paragraphs [0015], [0033]—[0036], and [0099]—[0102], and in FIG. 4 and FIG. 11, a queue depth is assigned for each of a plurality of queues, each queue being designated to store communication units of a predetermined quality of service level, and adjusting queue depths during use of a communication network, where queue depths are assigned at step 110 (FIG. 11), and at step 112 (FIG. 11), network characteristics are monitored, where mean cell arrival rates, average

throughput, ect. may be measured, and queue depths may be reassigned by returning to step 110, and this process of assigning queue depths 110 may be performed by buffer controllers (a network resource comprising buffer depth on a network element, a dynamic resource allocator being arranged to dynamically adjust respective buffer depth for each class for queuing data packets). It would have been obvious to one of ordinary skill in the art at the time of the invention to combine the invention of Donis with the invention of Giroux since Donis provides a system in which buffer depths are assigned to each queues and are appropriately reassigned over time by monitoring network characteristics, which can be introduced into the system of Giroux to allow queues to be assigned a maximum queue size that is appropriate to network characteristics that are being monitored, such as mean cell arrival rates, cell drop rates, cell delay rates, average throughput, ect., and to assign the maximum queue sizes according to these characteristics and optimize class of service performance.

**In regards to Claim 10**, Giroux teaches in column 1, line 62 to column 2, line 3, a method of fair queue servicing at a queuing point in a multi-service class packet switched network, wherein incoming packets are received in buffers and outgoing packets are scheduled by a weighted fair queue scheduler characterized in that real-time information of buffer usage along with the minimum bandwidth requirement is used to dynamically modify the weights of the weighted fair queue scheduler (a network resources comprises bandwidth of a communications channel fed by a network element).

**In regards to Claim 14**, Giroux teaches in column 3, lines 30-33, an Internet-like best effort service that compensates for low unitization of other service classes (a best-effort service is provided as a class).

**In regards to Claim 16**, Giroux teaches in column 3, lines 12-13, a connection admission controller computes the minimum bandwidth required for each service class (providing a communications network resource to a plurality of classes of use of a network, a different level of service being associated with each class of use).

Giroux also teaches in column 2, lines 11-24, a fair queue servicing arrangement in a multi-service class packet switched network, comprising a weighted fair queuing controller, and buffer means for receiving incoming packets in queues, characterized in that further comprises means for monitoring buffer usage for each queue, means for

determining the bandwidth requirements of each class of service, and a service weights manager for dynamically modifying the weights of said weighted fair queuing controller means in response to said buffer usage and bandwidth requirements (estimating a demand for each class, allocating to each class a proportion of a network resource, a proportion allocated being dependent on an estimated demand for each class, and an allocation optimizing use of an available network resource while ensuring a level of service of each class is observed).

Giroux also teaches in column 2, lines 49-52, a service weight manager that dynamically modifies weights to be used by a WFQ Scheduler (providing to each class a proportion of network resource allocated to it).

Giroux fails to clearly teach providing a network resource with buffer depth in a communications network element, and arranging to dynamically adjust respective buffer depth for each class for queuing data packets.

Donis teaches in paragraphs [0015], [0033]—[0036], and [0099]—[0102], and in FIG. 4 and FIG. 11, a queue depth is assigned for each of a plurality of queues, each queue being designated to store communication units of a predetermined quality of service level, and adjusting queue depths during use of a communication network, where queue depths are assigned at step 110 (FIG. 11), and at step 112 (FIG. 11), network characteristics are monitored, where mean cell arrival rates, average throughput, ect. may be measured, and queue depths may be reassigned by returning to step 110, and this process of assigning queue depths 110 may be performed by buffer controllers (providing a network resource with buffer depth in a communications

network element, and arranging to dynamically adjust respective buffer depth for each class for queuing data packets). It would have been obvious to one of ordinary skill in the art at the time of the invention to combine the invention of Donis with the invention of Giroux since Donis provides a system in which buffer depths are assigned to each queues and are appropriately reassigned over time by monitoring network characteristics, which can be introduced into the system of Giroux to allow queues to be assigned a maximum queue size that is appropriate to network characteristics that are being monitored, such as mean cell arrival rates, cell drop rates, cell delay rates, average throughput, ect., and to assign the maximum queue sizes according to these characteristics and optimize class of service performance.

**Claims 11 and 12** are rejected under 35 U.S.C. 103(a) as being unpatentable over Giroux in view of Donis, and further in view of Suni (Patent No.: US 7,149,185 B1), hereafter referred to as Suni.

**In regards to Claim 11**, as discussed in the rejection of Claim 1, Giroux teaches a demand estimator.

Giroux fails to teach using a traffic envelope scheme in which a characterization of traffic flow is conducted over a specified particular period.

Suni teaches in column 9, lines 60-64, a set of peak rates over numerous intervals of different lengths during some measurement window T, and the resulting maximal rate envelope describes the flow's maximal rate as a function of interval length (using a traffic envelope scheme in which a characterization of traffic flow is conducted

over a specified particular period). It would have been obvious to one of ordinary skill in the art at the time of the invention to combine the invention of Suni with the invention of Giroux since Suni provides a detailed method of using traffic envelopes in measuring data traffic for use in scheduling and queuing data, which can be adopted into the system of Grioux to provide efficient traffic scheduling.

**In regards to Claim 12**, as discussed in the rejection of Claim 1, Giroux teaches bandwidth requirements.

Giroux fails to teach a mean and a variance of consecutive traffic envelopes is determined to estimate effective bandwidth.

Suni further teaches in column 9, lines 60-64, a set of peak rates over numerous intervals of different lengths during some measurement window T, and the resulting maximal rate envelope describes the flow's maximal rate as a function of interval length (consecutive traffic envelopes is determined to estimate effective bandwidth requirements).

Suni also teaches in column 11, lines 27-30, a maximal rate envelope is estimated by determining estimates of mean and variance (a mean and a variance of consecutive traffic envelopes). It would have been obvious to one of ordinary skill in the art at the time of the invention to combine the invention of Suni with the invention of Giroux since Suni provides a detailed method of using traffic envelopes in measuring data traffic for use in scheduling and queuing data, which can be adopted into the system of Giroux to provide efficient traffic scheduling.

**Claim 13** is rejected under 35 U.S.C. 103(a) as being unpatentable over Giroux in view of Donis, Suni, and further in view of Knightly et al. (Patent No.: US 6,801,501 B1) and Boorstyn et al. ("Statistical Service Assurances for Traffic Scheduling Algorithms", December 2000, IEEE, IEEE Journal on Selected Areas in Communications, Vol. 18, No. 12, page 2656), hereafter referred to as Knightly and Boorstyn, respectively.

**In regards to Claim 13**, as discussed in the rejection of Claim 1, Giroux teaches demand estimator, traffic bandwidth, and traffic flow.

Giroux fails to teach a formula involving a first effective bandwidth and a second effective bandwidth, and traffic envelope. As discussed in the rejection of Claim 12, Suni teaches traffic envelopes. Suni further teaches worst case effective bandwidth estimate. Knightly and Boorstyn teach formulas.

Suni further teaches in column 15, lines 4-9, a worst possible case of a buffer need involving sources sending bursts of data (a worst case traffic flow). It would have been obvious to one of ordinary skill in the art at the time of the invention to combine the invention of Suni with the invention of Giroux since Suni provides a detailed method of using traffic envelopes in measuring data traffic for use in scheduling and queuing data, which can be adopted into the system of Giroux to provide efficient traffic scheduling.

Knightly teaches in column 4, lines 46-56, $\max_{k=1,2,\ldots,T-1}\left\{k\tau\left(\overline{R_k}+\alpha\sigma_k+\tau_k-C\right)\right\}$. It would have been obvious to one of ordinary skill in the art at the time of the invention to combine the invention of Knightly with the invention of Giroux since Knightly provides a

method involving a formula that can aid in scheduling data for limited resources and can be adopted into the system of Giroux to enhance its scheduling system for efficient scheduling.

Knightly fails to teach dividing the equation by $k\tau - \frac{q}{C}$. However, in the same filed of endeavor, Boorstyn teaches in page 2656, upper half of first column, $\frac{x}{\rho\tau}\frac{A^*(\tau)-\rho\tau}{A^*(\tau)-x}$. It would have been obvious to one of ordinary skill in the art at the time of the invention to combine the invention of Boorstyn with the invention of Knightly since Boorstyn provides many solutions for scheduling services and can be adopted into the system of Knightly to aid in ensuring quality of service.

**Claim 15** is rejected under 35 U.S.C. 103(a) as being unpatentable over Giroux in view of Donis, and further in view of Knightly.

**In regards to Claim 15**, as discussed in the rejection of Claim 1, Giroux teaches network data traffic.

Giroux fails to teach voice and video data is transferred across a network. Knightly teaches in column 1, lines 15-23, and in column 11, lines 60-63, network traffic includes video and audio (voice and video data is transferred across a network). It would have been obvious to one of ordinary skill in the art at the time of the invention to combine the invention of Knightly with the invention of Giroux since Knightly provides a method involving a formula that can aid in scheduling data for limited resources and can

be adopted into the system of Giroux to enhance its scheduling system for efficient scheduling.

### *Response to Arguments*

Applicant's arguments filed 06/04/2008 have been fully considered but they are not persuasive. Applicant submits that Giroux, in claim 1, states that weights used by the weighted fair queue scheduler are modified dynamically so as to cause buffer queue size to move toward a predetermined target value, i.e., traffic flow is manipulated so that buffer queues move towards a desired size, and is in total contrast to the approach of applicant's invention in which buffer size (buffer depth) is dynamically changed according to measured traffic. Examiner respectfully disagrees. Claim 1 of Giroux does not teach that the weights used by a weighted fair queue scheduler are not influenced by data traffic, or that a predetermined target value for a buffer queue size is not influenced by data traffic. Giroux teaches in column 2, line 49 to column 4, line 48, and in TABLE 2 and TABLE 3, and in FIG. 3 and FIG. 4, a minimum weight min_Wi is determined by either a peak cell rate (PCR) or a sustainable cell rate (SCR), which are related to cell traffic incoming from a source, and where TABLE 2 shows a typical example of which traffic descriptors that can be used to compute the minimum bandwidth for each basic service category relative to a queue service rate (SR), and where TABLE 2 implicitly shows that a larger sum of peak cell rates (PCR) or a larger sum of sustainable cell rates (SCR) increases min_Wi. This clearly shows that the minimum weights min_Wi of Giroux are changed according to cell traffic rates.

Furthermore, a target queue size (TQSi) is determined by a minimum weight min_Wi and, therefore, a target queue size (TQS) changes according to cell traffic rates. In addition, Giroux teaches in column 3, line 58 to column 4, line 41, and in FIG. 3 and FIG. 4, a service weight for each queue i (W_i) is determined from the arrival rate and the average arrival rate for each queue and, therefore, a service weight for each queue i (W_i) changes according to cell traffic rates.

Applicant's arguments with respect to claims 9-16 have been considered but are moot in view of the new ground(s) of rejection.

## *Conclusion*

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

- **Flinsbaugh (Patent No.: US 6,678,271 B1)** teaches in column 4, lines 59-63, and in column 5, lines 2-28 and 39-47, and in column 6, lines 8-13, and in FIG. 2, oversubscription is a difference between a worst case offered load condition (e.g., 5.12 Gb/s from a global bus 205, FIG. 2) and a best case service rate condition (e.g., 2.56 Gb/s from a local bus 302, FIG. 2), and where an amount of depth utilized per queue 213, 214 (FIG. 2) depends upon an amount of oversubscription, and guaranteed quality of service parameters specified by a system, and where a queue control unit 212 (FIG. 2) is capable of dynamically controlling the depth of each queue 213, 214 in response to current traffic conditions (a network resource comprising buffer depth on a network element, a

dynamic resource allocator being arranged to dynamically adjust respective buffer depth for a class for queuing data packets).

3. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to JOSHUA SMITH whose telephone number is (571)270-1826. The examiner can normally be reached on Monday-Thursday 9:30am-7pm, Alternating Fridays 9:30am-6pm, EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Hassan Kizou can be reached on 571-272-3088. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Joshua Smith
Patent Examiner
18 September 2008

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